



# NDDOT's use of the Transportation Enhancement Program to Restore Historic Bridges

[illegible]

GENERAL  
DAN  
INTEREST  
AND

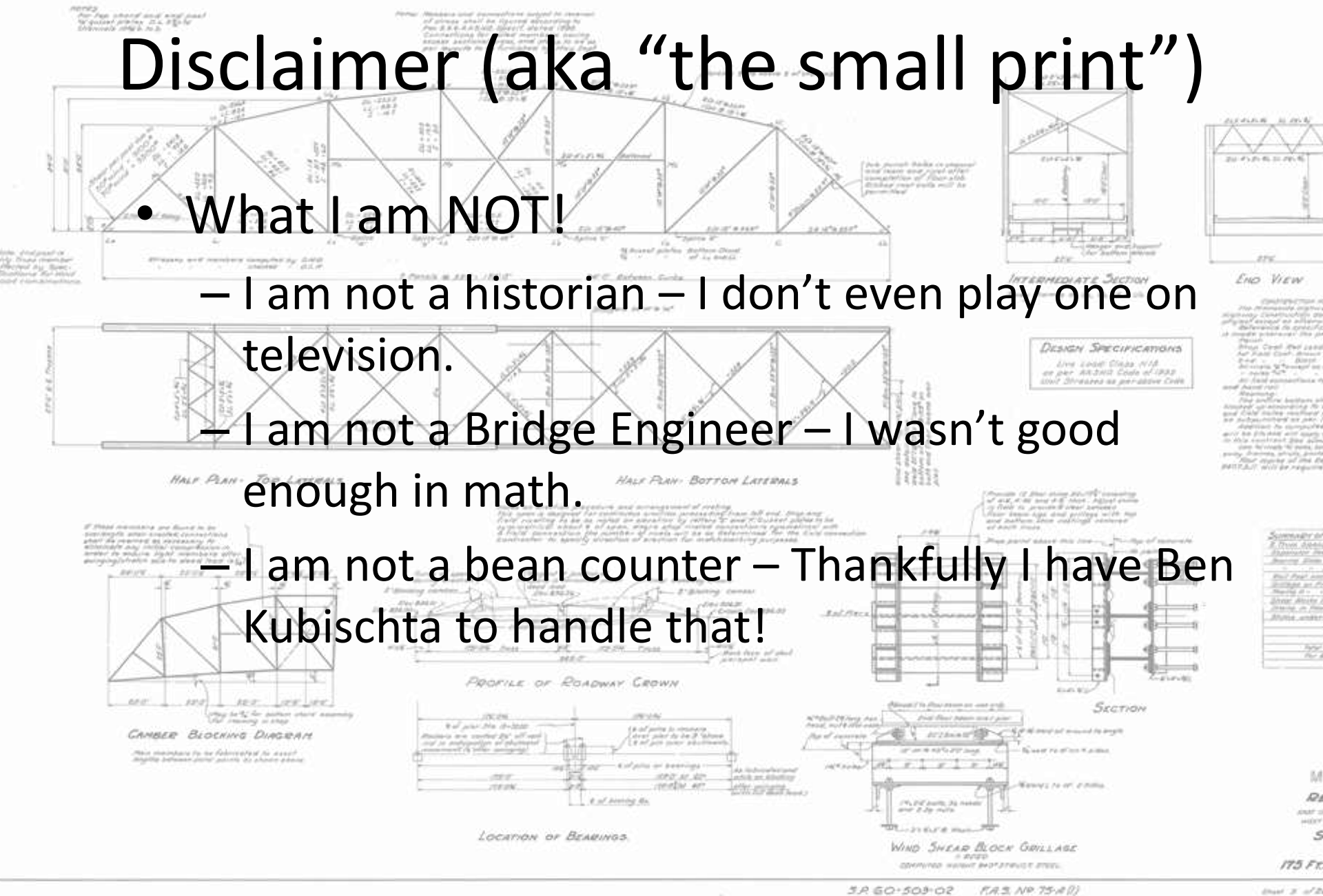
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E. J. Miller  
June 2000

MICROFILMED 2000

# Disclaimer (aka “the small print”)

- What I am NOT!
  - I am not a historian – I don’t even play one on television.
  - I am not a Bridge Engineer – I wasn’t good enough in math.
  - I am not a bean counter – Thankfully I have Ben Kubischta to handle that!



# What I AM:

- An archaeologist
  - By training and background
  - Don't do much "archaeology" anymore
- NDDOT Cultural Resource Specialist
  - Manage S.106 compliance for NDDOT projects
  - Ensure important resources are considered.
  - Work with archaeological, historical and architectural resources, including bridges.

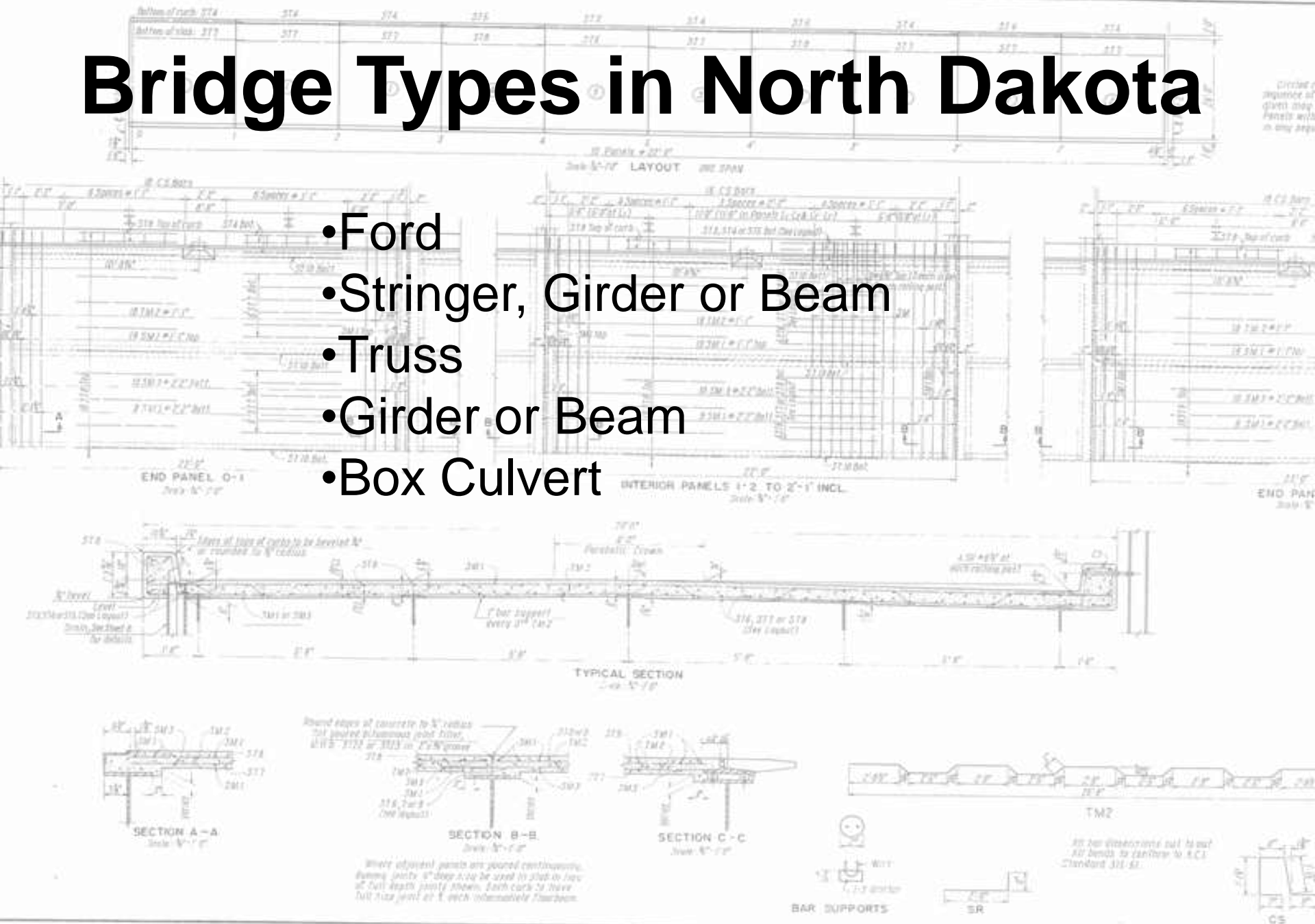


# ND Bridge History – In a Nutshell

- **First bridges were natural fords, ferries and improvised crossings.**
- **Early bridges were typically timber and had little engineering. They frequently washed out.**
- **Railroads built the first engineered bridges in the late 1800's.**
- **Late 1800's also saw some of the first iron and steel bridges – typically through truss or pony truss bridges.**
- **After Highway Commission was formed in 1913 more engineered roadway bridges were built.**

# Bridge Types in North Dakota

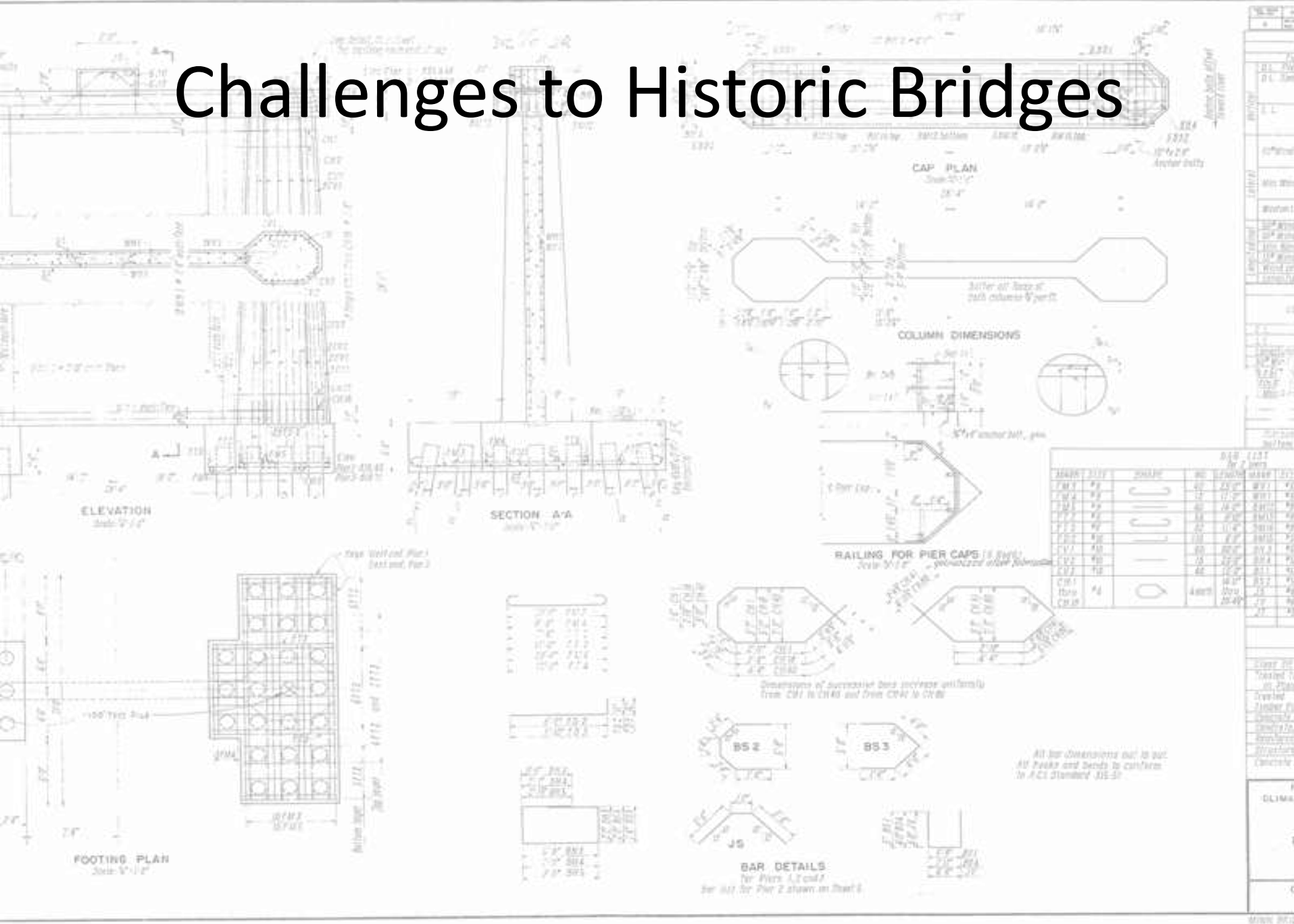
- Ford
- Stringer, Girder or Beam
- Truss
- Girder or Beam
- Box Culvert







# Challenges to Historic Bridges





# The Challenge of Historic Bridges

- Transportation needs change through time
- Most of our historic bridges designed for horse and wagon traffic



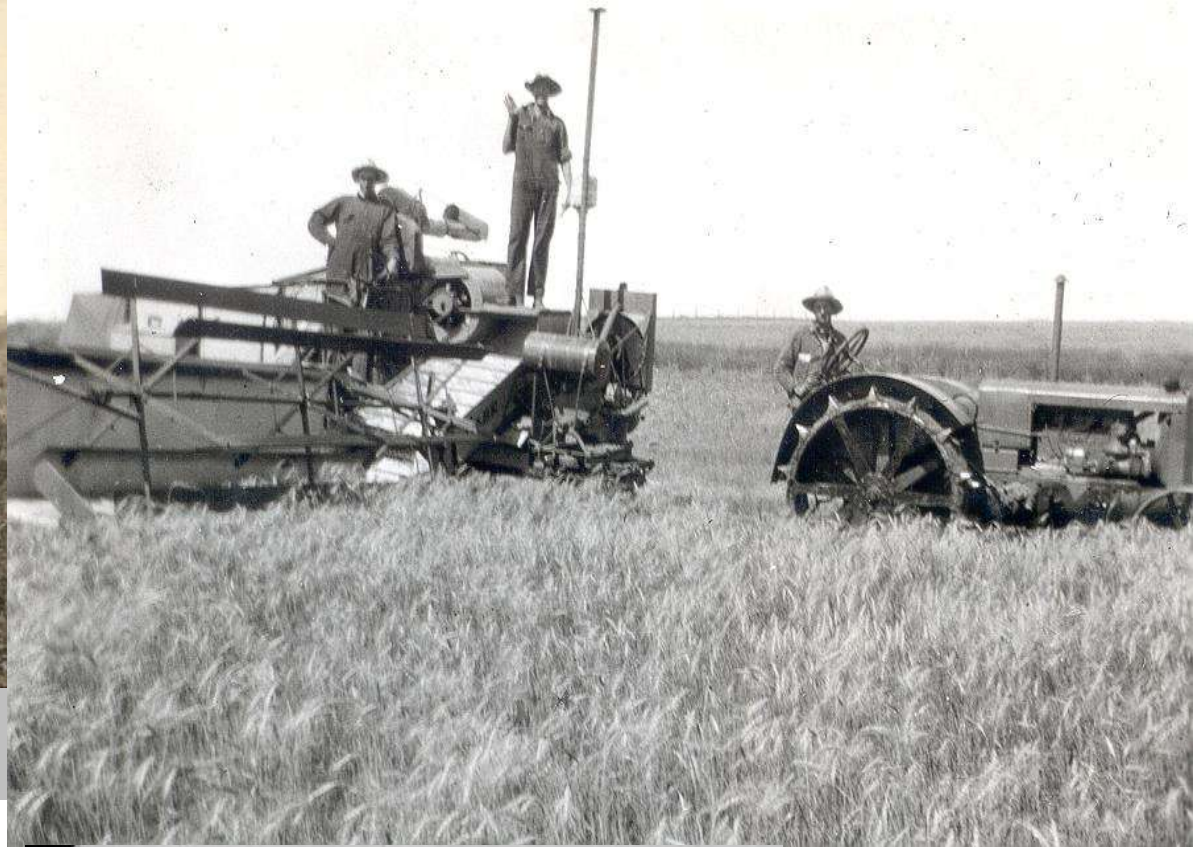
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SECTION C-C  
FOOTINGS FOR APPROACH BENTS  
Scale: 1/4" = 1'-0"

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3.00	3.00	3.00	3.00
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100.00	100.00	100.00	100.00



Then





- Modern farming and trucking has made many of our historic bridges “functionally obsolete”







2" O/O BACKWALLS

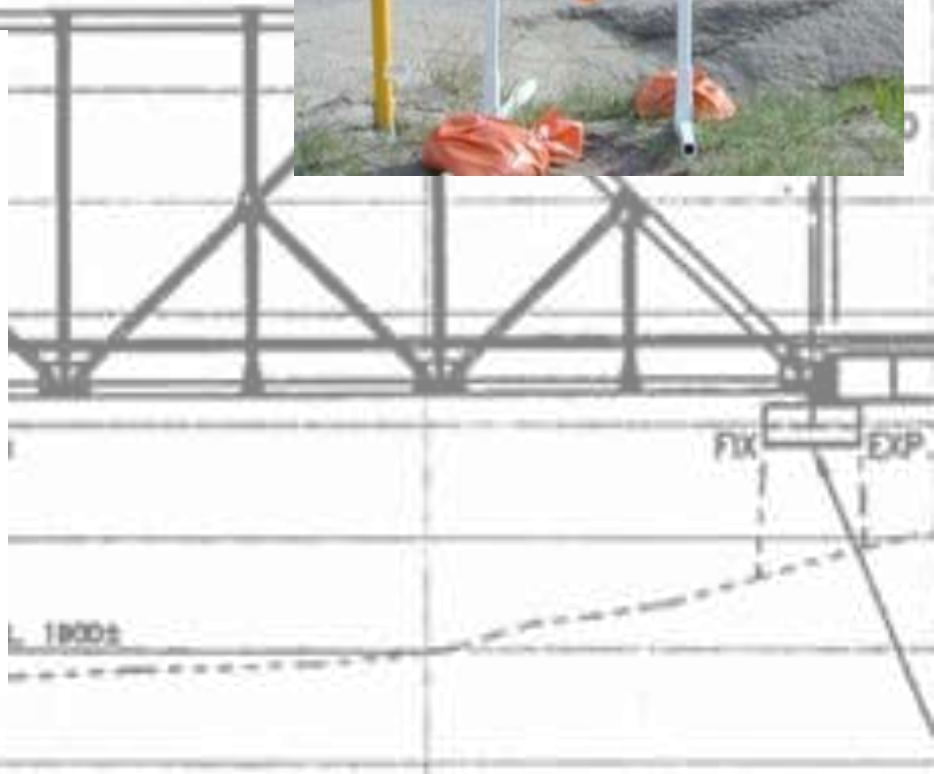
SPAN NO. 3

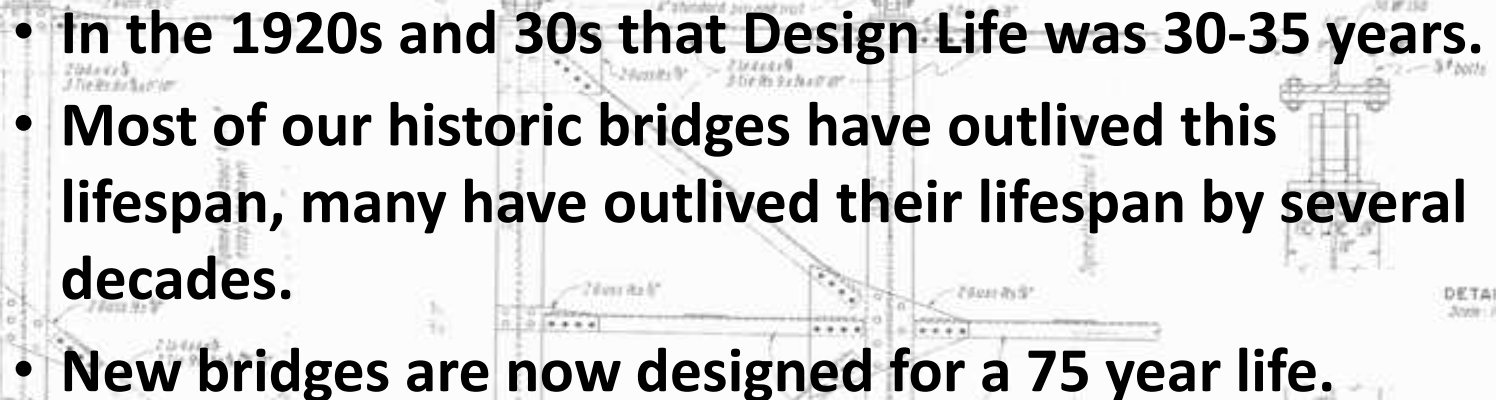
148'-6"

ROUGH TRUSS



**BRIDGE  
OUT  
DETOUR  
87 MILES**



- 
- In the 1920s and 30s that Design Life was 30-35 years.
  - Most of our historic bridges have outlived this lifespan, many have outlived their lifespan by several decades.
  - New bridges are now designed for a 75 year life.

- **Modern safety guidelines frequently mandate changes to historic bridge and guard rail**

— **Liability and risk of aging bridges difficult to offset**

Item	Amount	Quantity	Unit Price	Total
Columns	18,500	200	92.50	18,500.00
Bracing	9,000	200	45.00	9,000.00
Reinforcing	2,000	100	20.00	2,000.00
Steel Reinforcing Steel	2,000	200	10.00	2,000.00
Steel Lath			100.00	



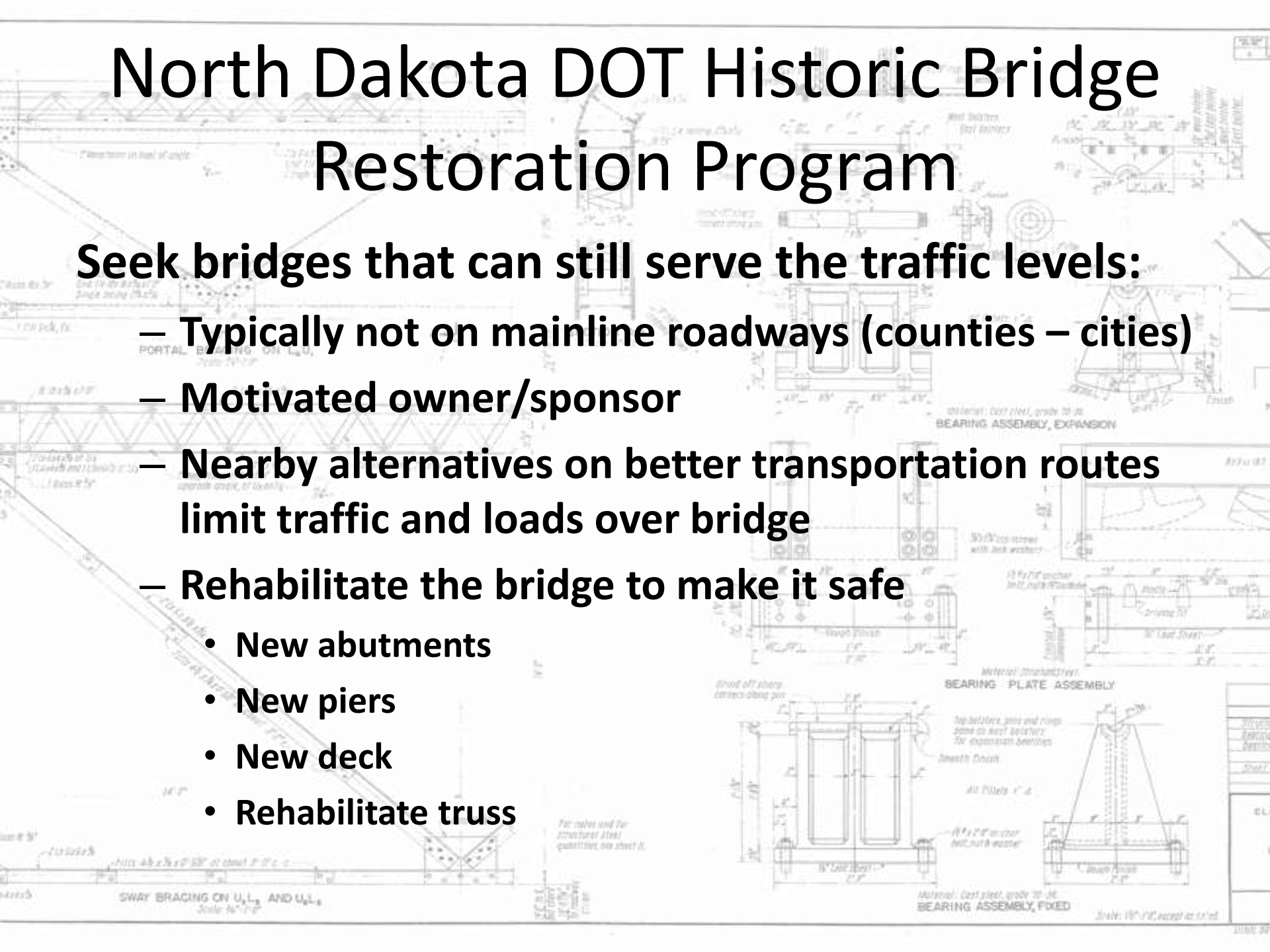




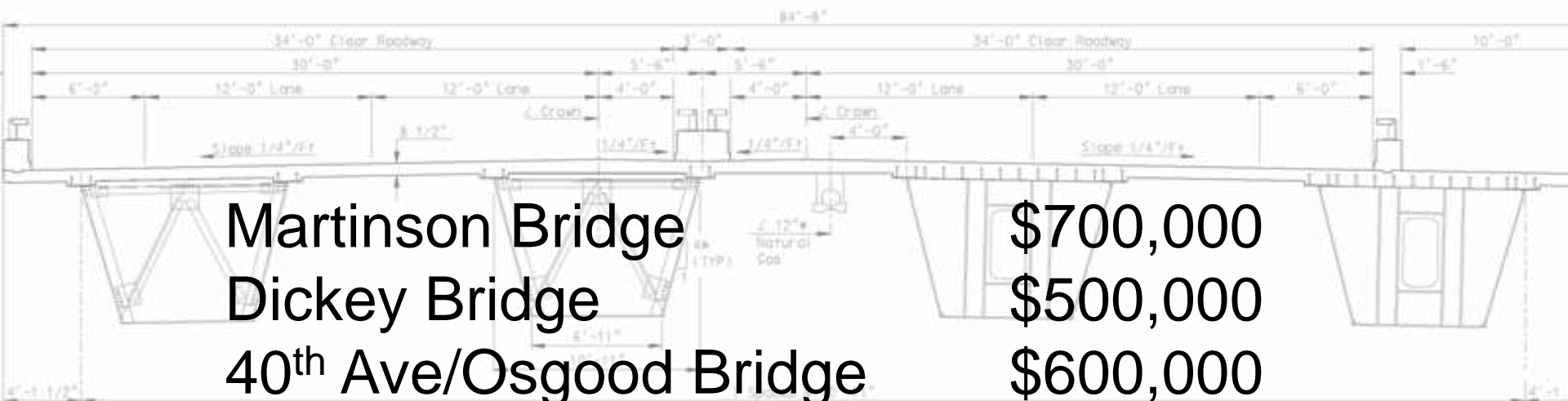
# North Dakota DOT Historic Bridge Restoration Program

**Seek bridges that can still serve the traffic levels:**

- Typically not on mainline roadways (counties – cities)**
- Motivated owner/sponsor**
- Nearby alternatives on better transportation routes limit traffic and loads over bridge**
- Rehabilitate the bridge to make it safe**
  - New abutments
  - New piers
  - New deck
  - Rehabilitate truss



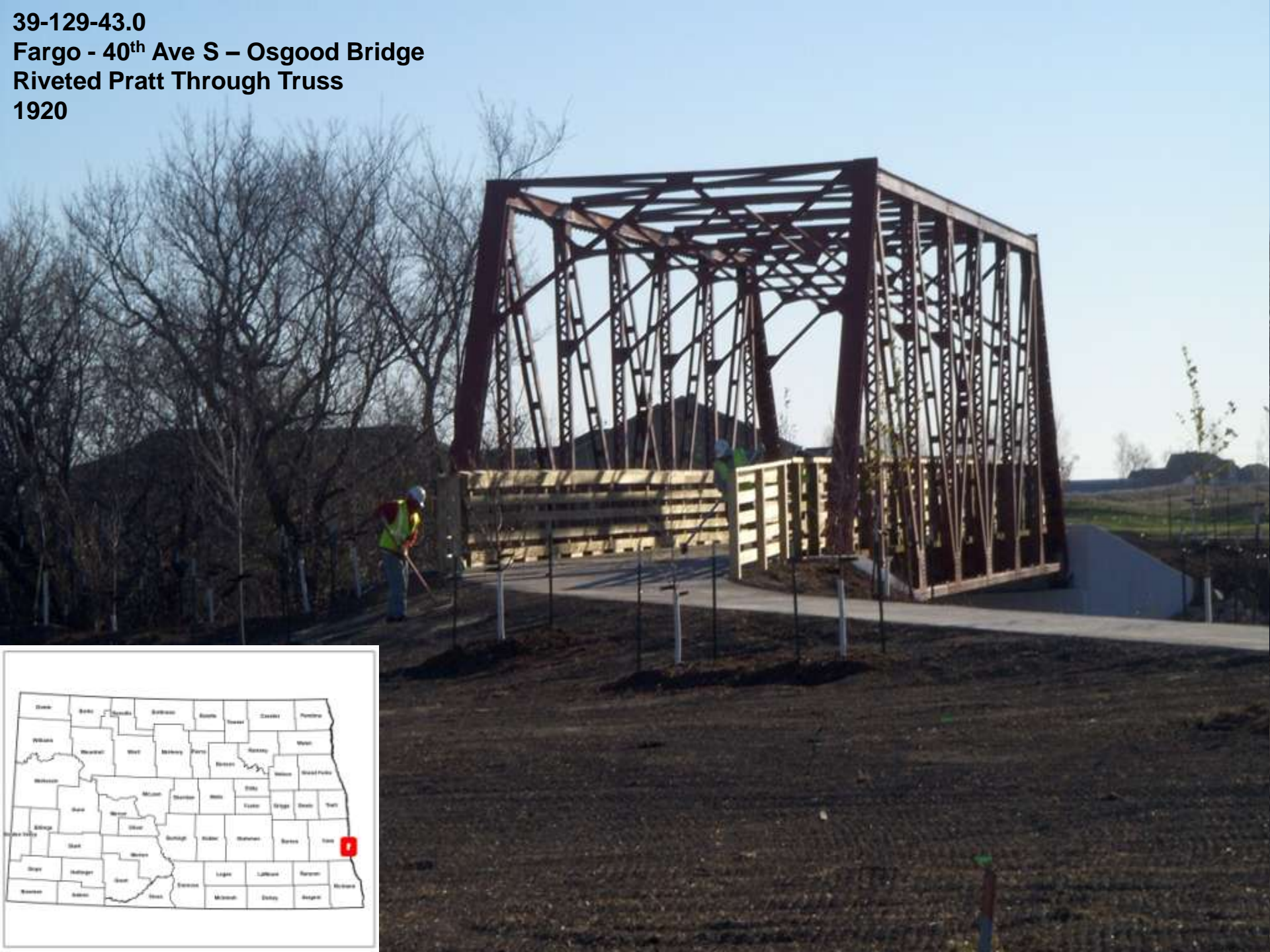
# NDDOT Bridge Rehabilitation



Martinson Bridge	\$700,000
Dickey Bridge	\$500,000
40 <sup>th</sup> Ave/Osgood Bridge	\$600,000
Valley City Pedestrian	\$350,000
Valley City Elks Footbridge	\$400,000
Viking Bridge	\$875,000



**39-129-43.0**  
**Fargo - 40<sup>th</sup> Ave S – Osgood Bridge**  
**Riveted Pratt Through Truss**  
**1920**





**23-128-07.0**  
**Dickey Bridge**  
**Riveted Warren Double Pony Truss**  
**1910 -1914**





49-104-11.0  
Viking Bridge  
Pratt Through Truss  
1885







## NDDOT Restoration Examples:

- Viking Bridge: Through Truss Rehabilitated



# Viking Bridge Pre-Rehabilitation





# Viking Bridge Pre-Rehabilitation





# Viking Bridge – Bridge Removed New Abutments





# Viking Bridge – Containment





# Viking Bridge – Removing Old Paint





# Viking Bridge – Removing Old Paint





# Viking Bridge – Replacing Key Components





# Cable Mod





# Viking Bridge – Ready For Coating



# Viking Bridge - Coating





# Viking Bridge – Coating Complete







Viking Bridge – Coating Complete





Viking Bridge – Resetting



Viking Bridge – Resetting





Viking Bridge – Done!





Viking Bridge – Done!



# NDDOT Restoration Examples:

- Martinson Bridge: Through Truss Rehabilitated





**37-108-9.0**  
**Pinned Pratt Through Truss**  
**1920**































06.27.2007 12:58







# After Rehabilitation

























# Valley City Elks Foot Bridge After Rehabilitation

















# NDDOT Historic Bridge Restoration

Robert Christensen

NDDOT

ETS – Cultural Resource Section

701-328-4539

[rchrister@nd.gov](mailto:rchrister@nd.gov)